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PROCEDURE FOR TRANSFERRING A DECORATION ONTO THE SURFACE
OF AN OBJECT

Jean-Noel Claveau

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PROCEDURE FOR TRANSFERRING A DECORATION ONTO THE SURFACE OF
AN OBJECT

[Procédé pour le transfert d'un décor sur la surface d'un objet]

Applicant:	Claveau, Jean-Noel
Inventor:	Claveau, Jean-Noel

This invention concerns a procedure for the transfer by sublimation of a printed design on a sheet of paper to an object of any shape.

There are known machines that permit the implementation of a procedure of this kind and that generally comprise, according to European patent application EP-A-0 252 610, an enclosure consisting of a rigid support and a cover with holes in it so as to allow passage, once the cover is closed, of only the surface of the object that is to be decorated. The object is placed on the base of the support, while a sheet of paper containing the decoration itself to be sublimated is placed on both the cover and the surface to be decorated.

An elastically deformable synthetic membrane covers the top of the enclosure, which when subjected to a vacuum presses the sheet of paper to be sublimated against the surface of the object.

The assembly, which is kept under depression, is put into an electrical kiln to cause sublimation of the design to a few millimeters of depth.

The so-called sublimation method of decoration currently used in the earlier technique is useful only for flat or only slightly rounded pieces, otherwise the sheet of paper coated with at least one layer of material to be sublimated wrinkles and causes unacceptable defects in the look of the decoration. Furthermore, the machines used do not permit decoration to be applied to the entire surface of an object.

The improvements provided by the invention remedy the disadvantages described above and are aimed more specifically at a procedure for cold or hot sublimation of a design over the entire surface of an object of whatever shape, as well as the machine to implement it.

The procedure according to the invention is characterized by the fact that it consists of:

- adhering an insulation layer to the surface of the backing paper that is opposite from the decoration to be sublimated;

- positioning the backing paper so that the surface covered with the insulation layer is in contact with the lower membrane of the enclosure;

- placing at least one object of whatever shape onto the backing paper;

- covering the object with another backing paper for the decoration to be sublimated so that its decorated surface is in contact with the object;

- hermetically closing the enclosure by means of at least one upper elastic impermeable membrane;

- subjecting the enclosure to depression;

- and placing the enclosure in a kiln heated to the appropriate temperature thereby transferring the decoration.

By way of variation, the procedure according to the invention consists of:

- impregnating a cloth with a solvent of the material that the object is made of;

- placing the cloth onto the lower membrane of the enclosure;

- soaking with water the backing paper of the decoration to be sublimated;

- positioning the backing paper so that its unprinted surface is in contact with the cloth;

- placing at least one object to be decorated onto the backing paper;

- covering the object with another backing paper for the decoration to be sublimated that has been soaked in water;

- placing another solvent-impregnated cloth onto the backing paper;
- hermetically closing the enclosure by means of an upper elastic impermeable membrane;
- and subjecting the entire enclosure to depression for a certain amount of time in order to ensure transfer of the decoration;

The attached drawings, given by way of example, will make it easier to understand the invention, its characteristics and the advantages it can provide:

Figure 1 is a diagram in perspective of a machine for implementing the procedure according to the invention.

Figures 2 and 3 illustrate the positioning of the objects and the various phases of the procedure according to the invention.

Figure 4 illustrates a variant procedure according to the invention.

Figure 5 is a diagram of an oil-bath kiln for implementing the procedure.

The machine represented in Figure 1 basically comprises two square aluminum frames 1 and 2 that are joined together in such a way that one is fixed and the other is movable.

Thin airtight elastic membrane 3, 4 is glued or otherwise fastened to the lower faces of frames 1 and 2. The membranes in question may, for example, be made of acetic silicone capable of withstanding high temperatures and high elastic deformation.

The bottom of frame 1 is equipped with flat airtight seal 5 made of the same material as membranes 3 and 4, so as to form a hermetic seal when frames 1 and 2 are pressed together by means of locks 6 attached to frame 1. These locks may be of the

munitions-box-closing type that work together with fixed latches 7 attached to frame 2.

Tubes 8 connected to vacuum pump 9 pass through the side edges of frame 1, so that said tubes open into groove 10 provided in the interior of frame 1 so as to ensure proper distribution of the depression throughout the entire periphery of the sealed enclosure.

The first phase of a first variation of the procedure according to the invention consists of adhering an insulation layer such as aluminum foil 11 to one face of the backing paper that is, for example, a sheet of paper 13 whose opposite surface is coated with decoration 12 consisting of a layer of material suitable for sublimation. This phase is implemented only in the case of heat sublimation in order to prevent the outward dispersion of the colors of decoration 12.

The second phase of the procedure consists of placing backing paper 13 on membrane 3 so that aluminum foil 11 is in contact with said membrane 3 as illustrated in Figure 2.

Then at least one object 14 in any shape whatever is placed in sheet 13. In the example shown in Figure 2, two objects 14, 14' are placed side by side.

The object is then covered with a second sheet of paper 13' so that its sublimating decoration 12' is in contact with said object, while aluminum foil 11' is facing membrane 4 of frame 2. Frame 2 is closed on frame 1 by means of locks 6-7 so as to obtain a complete hermetic seal between flat seal 5 and membrane 4.

Vacuum pump 9 is engaged so as to subject the enclosure formed by frames 1 and 2 to depression, while membranes 3 and 4 are aspirated to cause them to be flattened forcefully against

sheets of paper 13, 13' whose decorations 12, 12' are pressed against all outer surfaces of object 14, 14' (Figure 3).

While subject to depression, the enclosure is placed in a standard electrical kiln that includes elements 15. This phase permits decorations 12, 12' on each sheet 13, 13' to be sublimated and to penetrate by a few millimeters into the entire surface of object 14, 14'. The time the enclosure spends in the kiln depends on the material of object 14, 14' to be decorated (Figure 3), so as to prevent its being damaged.

When the material of object 14, 14' cannot withstand a long period of heat before risking deformation, it is preferable to place frames 1 and 2 of the enclosure subject to depression in sack 100 connected to rigid frame 101 as shown in Figure 5.

Sack 100 is made of a similar material as membranes 3 and 4 of the enclosure, that is to say acetic silicone capable of withstanding high temperatures and high deformation. Sack 100 is then immersed in oil bath kiln 102 where oil 103 is kept at a temperature of from 200°-250° by means of elements 104. Sack 100 immersed in kiln 102 is deformed by the effect of the pressure of oil 103 so as to be flattened against the entire exterior surface of membranes 3 and 4 of the enclosure. This deformation immediately conducts heat to sheet 13, 13' and to the surface of object 14, 14' in order to transfer decoration 12, 12' onto the entire surface of object 14, 14'. This transfer is achieved in a few seconds, thereby permitting the perfect reproduction of decoration 12, 12' without causing any deformation of the object.

The final operation consists of opening the enclosure and removing backing paper 13' that is attached to aluminum foil 11', decoration 12' being indelibly fixed to object 14, 14' on part of its exterior.

Then object 14, 14' is removed, as well as paper 13 attached to aluminum foil 11 whose decoration 12 has been transferred to all parts not decorated by upper decoration 12'.

In order to transfer sublimating decoration onto objects that cannot withstand enough heat to employ the above-described procedure, cold transfer is done as follows:

First, the backing paper for the sublimating decoration or the sheet of paper does not include the insulation layer made up of aluminum foil 11, 11'.

Cloth 16 impregnated with solvent is placed on membrane 3 of frame 1 of the enclosure (Figure 4).

Sheet of paper 17 and its decoration 18 are soaked in water.

Sheet of paper 17 is positioned so that its unprinted side is in contact with cloth 16.

At least one object 14, 14' of whatever shape is placed on sheet of paper 17.

Object 14, 14' is covered with a second sheet of paper 17' so that its decoration 18' is in contact with object 14, 14'.

Another cloth 16' impregnated with solvent is placed on paper 17'.

Frame 2 is closed on frame 1 by means of locks 6-7 so as to obtain a complete hermetic seal between flat seal 5 and membrane 4.

Vacuum pump 9 is engaged so as to subject the enclosure formed by frames 1 and 2 to depression, while membranes 3 and 4 are aspirated to cause them to be flattened forcefully against sheets of paper 17, 17' whose sublimating decorations 18, 18' are pressed against all outer surfaces of object 14, 14'.

While the enclosure is subject to depression, decoration 18, 18' is diluted by the solvent impregnating cloth 16, 16' so as to

be transferred to the outer surface of object 14, 14'. It should be noted that the fact that sheets of paper 17, 17' are soaked with water retards the transfer of the solvent to decoration 18, 18' and prevents the motifs from being broken-down by the solvent, which merely sublimates the decoration onto the object.

The final operation consists of opening the enclosure, removing cloth 16, 16', then sheets of paper 17, 17', decorations 18, 18' having been indelibly fixed to object 14, 14'.

Thus, the decoration procedure may be done either hot or cold, using the same machine in either case.

The decoration procedure employed by such a machine makes it possible to decorate objects of any shape as needed over their entire surface.

Claims

1. Procedure for decorating the surface of an object (14, 14') by transferring a decoration (12, 12') using a machine, wherein it consists of:

- adhering an insulation layer (11) to the opposite surface of the backing paper (13) from the decoration (12);

- positioning the backing paper (13) so that the surface covered with the insulation layer (11) is in contact with a first elastic impermeable membrane (3) attached to a frame (1) of the enclosure;

- placing at least one object (14, 14') of whatever shape onto the backing paper (13);

- covering the object (14, 14') with another backing paper (13') so that its decorated surface (12') is in contact with the object, the opposite side being covered with an insulation layer

(11') facing the second elastic impermeable membrane (4) on a frame (2) of the enclosure;

- hermetically closing the enclosure so that the insulation layer (11') is in contact with the second membrane (4);
- subjecting the enclosure to depression;
- and placing the enclosure in a kiln heated to the appropriate temperature thereby transferring the decoration (12, 12') by sublimation to the body of the object (14, 14').

2. Procedure for decorating the surface of an object (14, 14') by transferring a decoration (18, 18') using a machine, wherein it consists of:

- impregnating a cloth (16) with a solvent of the material that the object (14, 14') is made of;
- placing the cloth (16) onto a first elastic impermeable membrane (3) attached to a frame (1) of the enclosure;
- soaking in water the backing paper (17) of the decoration (18) to be sublimated;
- positioning the backing paper (17) so that its unprinted surface is in contact with the cloth (16);
- placing at least one object (14, 14') to be decorated onto the backing paper (17) in contact with the decoration (18);
- covering the object (14, 14') with another backing paper (17') that has been soaked in water so that the decoration (18') is in contact with the object;
- placing another cloth (16') impregnated with solvent onto the backing paper (17');
- hermetically closing the enclosure so that the second elastic impermeable membrane (4) attached to a frame (2) comes into contact with the cloth (16');

- and subjecting the entire enclosure to depression for a certain amount of time in order to ensure transfer by sublimation of the decoration (18, 18') to the body of the object (14, 14').

3. Machine for implementing the procedure according to Claims 1 and 2 comprising two frames joined together, one of whose surfaces is attached to an elastically deformable membrane, wherein the frame (1 and 2) are made of aluminum and the membranes (3 and 4) of acetic silicone that is capable of withstanding high temperature and high deformation when the enclosure is placed in a kiln.

4. Machine for implementing the procedure according to Claims 1 and 3, wherein the frames (1 and 2) subjected to depression are placed in a sack (100) made of acetic silicone so that they may be immersed in an oil bath kiln 102 in order to transfer the decoration (12, 12') to the surface of the object (14, 14') without causing any deformation of the object.

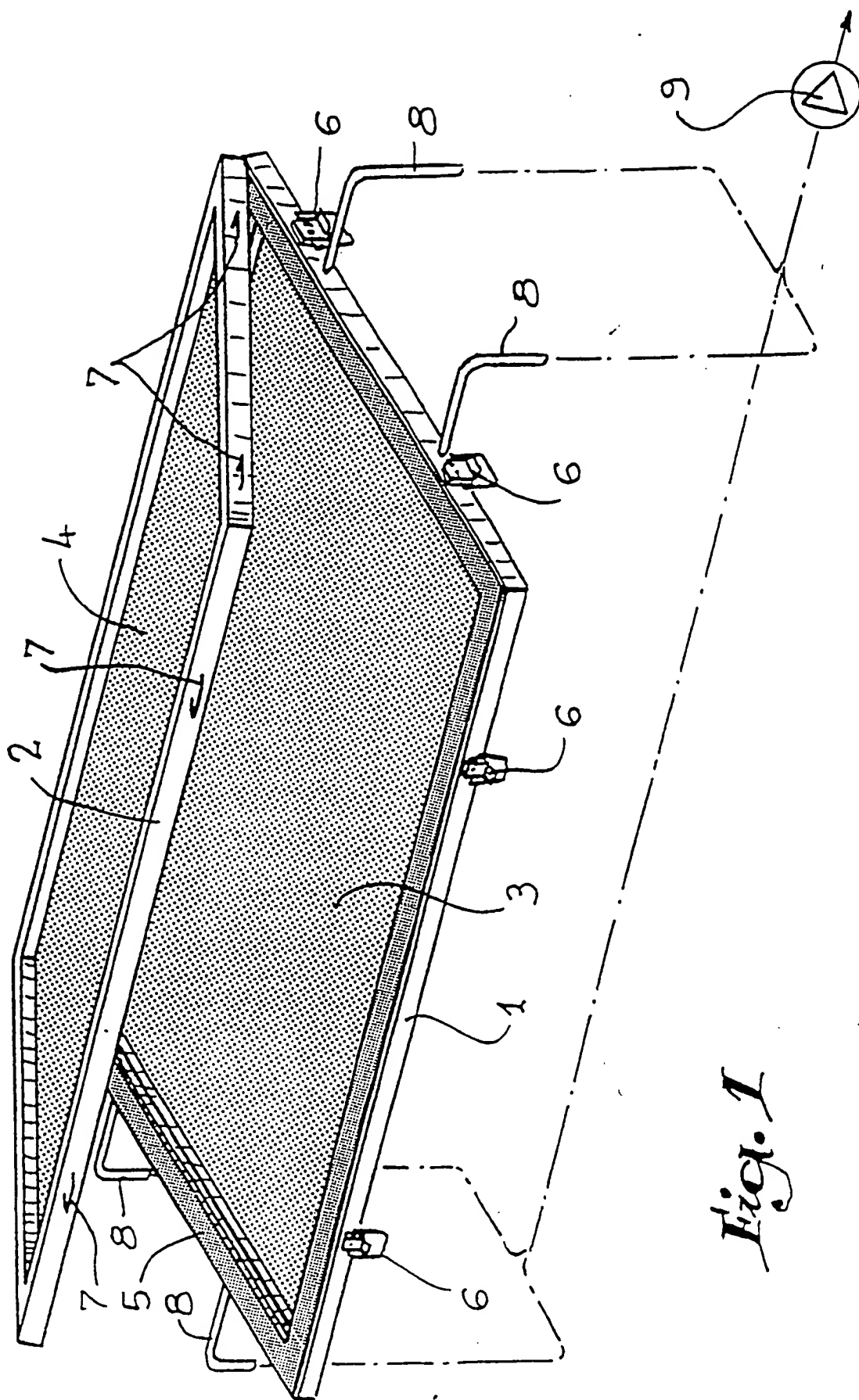


Fig. 1

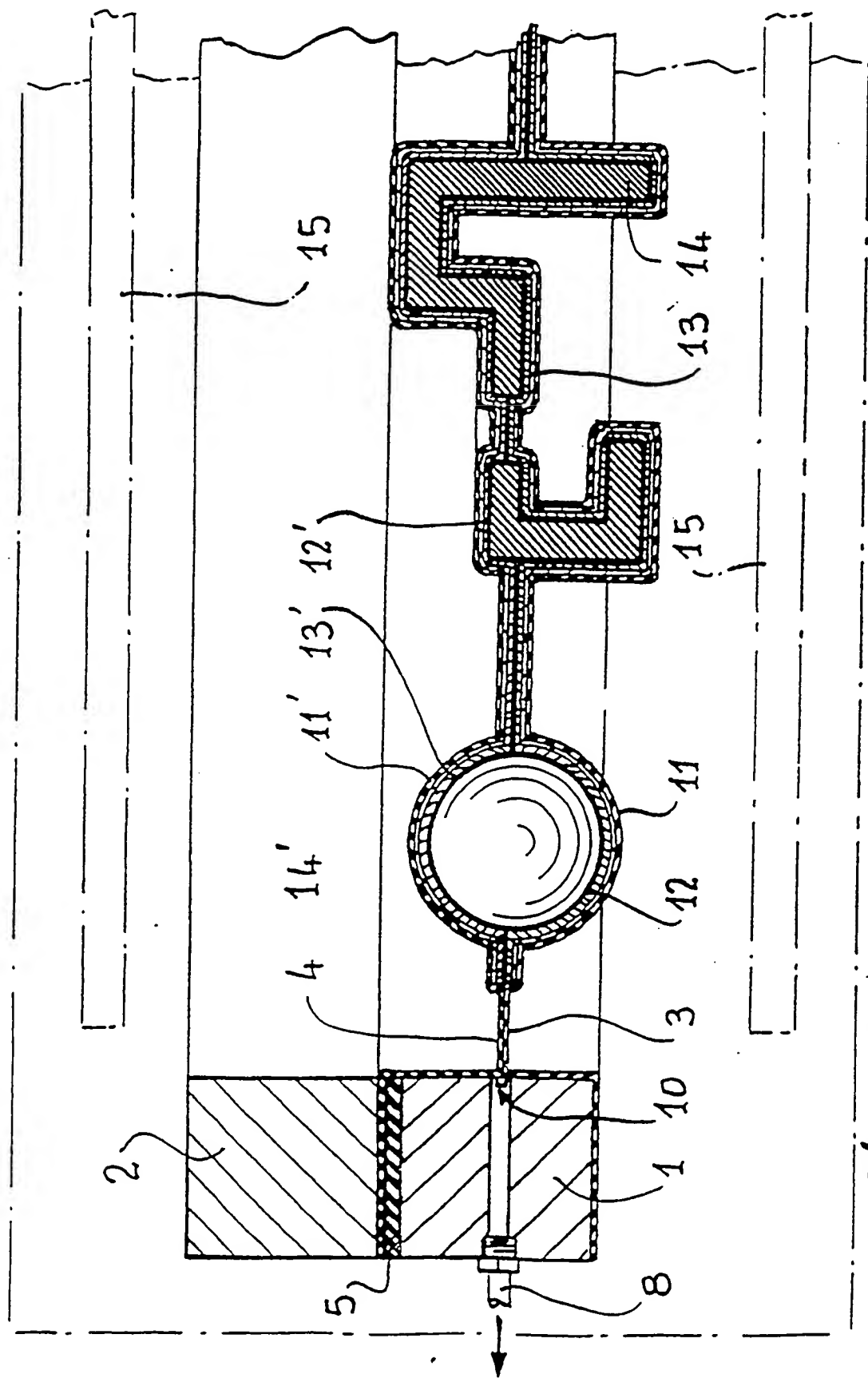
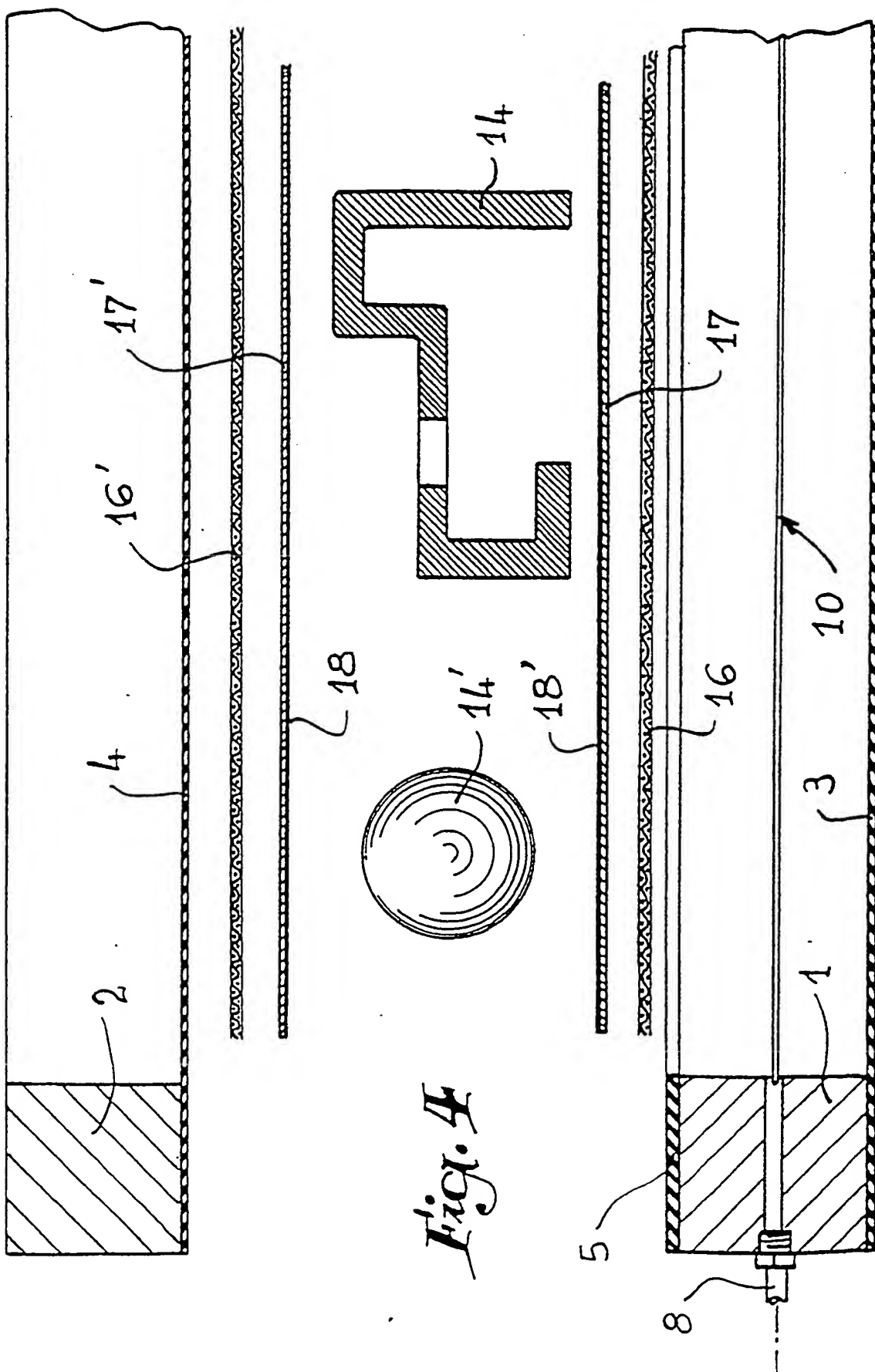
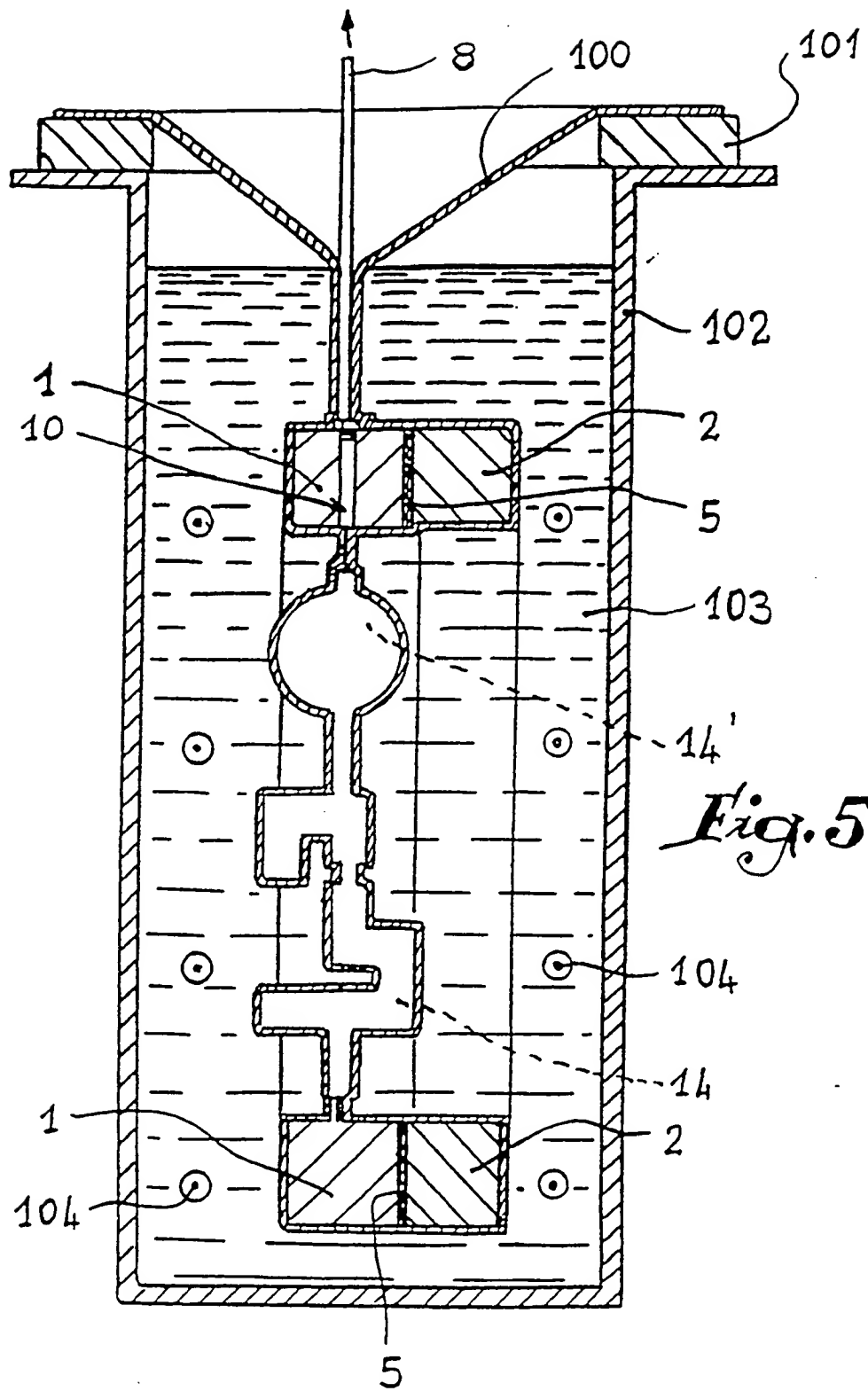


Fig. 3



*Fig. 5*

EUROPEAN SEARCH REPORT

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int Cl ⁵)
X	FR-A-2 203 321 (VILLEROY & BOCH) * Page 1, lines 1-3, 23-33; page 2, lines 1-10, 18-36; Figures 1-2 *	3	B 44 C 1/16 B 41 M 5/035
A	---	1-2	
A	FR-A2 177 302 (SOCIETE D'ETUDES DU PROCEDE NORIDEM) * Page 1, lines 1-19; age 2, lines 8-25 *	1	
A	---		
A	FR-A- 672 722 (GEISEL) * Page 2, abstract *	2	
A	---		
A	GB-A-1 338 475 (HAYDOCKS DYERS LTD) * Page 1, lines 9-32, 49-70; Figure 1 *	4	
A	---		
A	WO-A-8 907 530 (KRANICZ) ---		
A	US-A-2 647 337 (MARTIN) ---		
D,A	EP-A-0 252 610 (MASCOPRINT) -----		
The present search report has been drawn up for all claims.			TECHNICAL FIELDS SEARCHED (Int Cl ⁵) B 44 C B 41 M B 41 F
Place of search THE HAGUE		Date of completion of the search June 11, 1991	Examiner SOEDERBERG J.-E.
CATEGORY OF CITED DOCUMENTS X: Particularly relevant if taken alone. Y: Particularly relevant if combined with another document of the same category. A: Technological background. O: Non-written disclosure. P: Intermediate document T: Theory or principle underlying the invention. E: Earlier patent document, but published on, or after the filing date. D: Document cited in the application. L: Document cited for other reasons. &: Member of the same patent family, corresponding document			